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最終頁に続く

(54) 【発明の名称】 食肉加工用水中油滴型乳化液、該乳化液を注入した食肉加工製品及びその製造方法

(57) 【要約】

【目的】 加熱により、ばさついたり筋っぽい食感になりがちな食肉製品に軟らかくジューシーな食感を付与すると同時に高い加熱調理歩留を与える食肉加工用水中油滴型乳化液を提供する。

【構成】 食用油脂と α 化澱粉と β 澱粉を共に分散安定化させた水懸濁液を乳化剤を用いて乳化した食肉加工用水中油滴型乳化液。および該乳化液を食肉に注入し得られる軟らかくジューシーな食肉加工品およびその製造方法。

【効果】 食肉製品にビッケル液として用いた場合、よりジューシーな食感を付与することができる。

【特許請求の範囲】

【請求項1】 油脂分10～50重量%および α 化澱粉と β 澱粉の混合物を5～20重量%および乳化剤を含むことを特徴とする食肉加工用水中油滴型乳化液。

【請求項2】 α 化澱粉が飽和物10%水溶液または水分散液のB型粘度が200cps以下の α 化澱粉であることを特徴とする請求項1記載の食肉加工用水中油滴型乳化液。

【請求項3】 乳化剤が親油性澱粉であることを特徴とする請求項1または2記載の食肉加工用水中油滴型乳化液。

【請求項4】 α 化澱粉と β 澱粉の配合比が1:9～5:5であることを特徴とする請求項1～3のいずれか1項記載の食肉加工用水中油滴型乳化液。

【請求項5】 油脂として融点 -20°C ～ 40°C の食用油脂を使用することを特徴とする請求項1～4のいずれか1項記載の食肉加工用水中油滴型乳化液。

【請求項6】 請求項1～5記載の水中油滴型乳化液を注入して得られる食肉加工製品。

【請求項7】 請求項1～5記載の水中油滴型乳化液を注入することを特徴とする食肉加工製品の製造方法。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 本発明は加工後の食感および加熱調理歩留に優れた食肉加工製品を製造する食肉加工用水中油滴型乳化液に関するものである。また、当該食肉加工用水中油滴型乳化液を使用したビッケル液を用いて製造した食肉加工製品およびその製造方法に関するものである。

【0002】

【従来の技術】 適度な水分と適度な油脂分を保持した、牛や豚等の畜肉、鶏や鴨などの鳥肉などはその後の適当な流通形態、調理方法によりジューシーな食感を楽しむことができる。しかし、同じ肉でも、生育環境、部位、精肉後の流通状態により、肉の状態は変化する。特に、もともと硬く筋っぽい部位や、冷凍などの過酷な流通形態およびその後の加熱調理時に生じるドロップなどにより肉本来のジューシーさが損なわれ商品価値が落ちてしまうものもある。従って、肉の部位、流通形態、生育環境などによらず、肉のおいしさを十分堪能できるように改良が望まれる。

【0003】 従来、このような食肉加工品の改良、加工方法には各種のものがあった。たとえば、ブロック肉に、蛋白質、多糖類、澱粉、プロテアーゼなどの酵素類、界面活性剤等のうち1種類もしくは2種類以上を組み合わせて添加した、いわゆるビッケル液と呼ばれるものを用いたり、脂肪分の少ない食肉に対しては粉末油脂や液状油、固形脂等を直接添加したり、水中油型、油中水型、さらには水中油中水型エマルジョンを注入することにより風味、食感、加熱ドロップなどが改善されてき

た。

【0004】 例えば、特開昭59-162853号公報では熱凝固性蛋白溶液を注入する方法、特開平1-144961号公報では加熱した蛋白質に蛋白凝固剤を添加する方法、特開平8-107760号公報では大豆蛋白と油脂の乳化物に親油性澱粉もしくはワキシーコーンスターチを添加したものが記載されている。しかし、肉以外の異種蛋白を注入する方法は良好な加熱歩留が得られるが、ビッケル液調整時にタマになって液に分散しにくく、さらにビッケル液の粘度が高くなり気泡を抱いてしまう。よって均一なビッケル液を得るために消泡工程をとらねばならず、生産効率が落ちる一因となる。また、蛋白素材は硬いゲルを形成するが、肉とは異なるジューシー感のないばさついた食感になってしまう。更に蛋白素材は食肉加工品とは異なる風味をもつため食味を低下させるという欠点があった。

【0005】 また特開平5-260927号公報ではカードランと肥料の併用、特開平8-128404号公報ではゲル形成性澱粉分解物とゲル非形成性澱粉を併用した加工生肉、特開平10-99051号公報では澱粉とデキストリンを併用した加工生肉に関して記載されている。しかし、カードランなどの多糖類を添加した場合、蛋白のような異味はないが、ゲル強度を高めるような濃度ではビッケルの粘性が極めて高くなるためインジェクターに負担がかかり、かつ高い粘性のために生じるビッケル液中の泡が肉中に残存し、最終製品に空洞が生ずる等の操作性に問題があった。また、食感は硬くなるがジューシーさを出すことはできない。また、澱粉や澱粉分解物のみを添加したビッケル液を使用すると、良好な加熱歩留が得られ、それ自体風味を持たないため、食肉加工品の風味を損なうことはないが、これもジューシーさを出すには及ばない。

【0006】 そのため粉末油脂や液状油、固形脂等を直接ビッケル液に添加して、食肉にある程度のジューシー感を与えることが知られている。例えば油脂を加熱溶解してビッケル液として直接注入する方法（特開昭60-41467号公報）、油中水型乳化液をビッケル液として注入する方法（特開昭59-162853号公報）、HLB3以下のショ糖不飽和脂肪酸エステルを含む油中水型乳化液に関するもの（特開平6-253782号公報）が知られている。しかし、油中水型乳化液をビッケル液として注入する方法によれば、ある程度のジューシー感を得られるが注入した油脂が加熱調理後にほとんど溶出するため食感改良効果としては不十分である。また、融点の高い油脂を用いる場合、油脂の融点以上の温度で加熱して用いなければならないため、衛生上の問題があった。

【0007】 また、水中油滴型乳化液をビッケル液として注入する方法（特開昭58-89161号）や、水中油滴型乳化液を熱凝固性蛋白質とともに食肉へ打ち込

み、加熱調理によって固定化し、霜降り状組織をもつハム製品を製造する方法に関するもの（特開平4-341159号）、大豆蛋白質などの凝固性蛋白質を含むエマルジョンを食肉中に含ませた後、低温保持により解乳化させて得られる食肉加工品の製造方法（特開平9-266769号公報）についても提案されている。しかし、水中油滴型乳化液をそのままピクル液として注入する方法は、ジュシー感はある程度改善されるが、加熱調理時の歩留がよいといった問題点があった。更に、水中油滴型乳化液を凝固性蛋白質とともにピクル液として注入する方法によると、油滴が凝固性蛋白質とともに肉中で固定化されて、油脂の添加濃度にしてはジュシー感を付与するには不十分であった。また、蛋白質の異味が肉の風味を損なう等の問題点があった。

【0008】本発明者は先に食肉の食感改善を目的として加工澱粉と糖類の併用（特開平7-271721号公報）および限定分解された冷水可溶性澱粉と β 澱粉を併用したピクル（特開平9-308462号公報）の食肉加工品への利用について提案している。これらの発明は、作業性に優れ、経済的に柔らかな肉質を得られる効果があったが、肉本来のジュシーさを補うには改良すべき点もあった。

【0009】

【課題を解決するための手段】本発明者は、繊維分が多く脂肪分が少ないため硬くてジュシーさに欠ける食肉を、柔らかくジュシーに改良するために鋭意研究を重ねた結果、油相部と α 化澱粉を含む澱粉混合物を懸濁させた水相部を乳化剤によって乳化させた水中油型乳化液をピクル液として注入することにより、加熱調理時に食肉本来のジュシーさをもつ食肉加工品を得られることを見出し、本発明を完成させた。

【0010】すなわち、本発明は食肉中に食用油とある一定の膨潤度をもった α 化澱粉および β 澱粉を分散安定化させた水懸濁液を親油性澱粉のような乳化剤で乳化した食肉加工用水中油滴型乳化液に関するものであり、また、当該食肉加工用水中油滴型乳化液を使用したピクル液および当該水中油滴型ピクル液を用いて製造した食肉加工品およびその製造方法に関するものである。

【0011】本発明による水中油滴型乳化液が、食肉にジュシー感を与える作用機構は定かたではないが、以下のごとく推測される。肉を食したときにジュシーと感じるのは、肉の油分もしくは脂溶性の香味、うまみ物質を感じていると思われる。この場合、乳化している油滴の大きさがジュシーであるか否かに大きく影響している。一般的に乳化が安定なときは油滴の大きさは小さく、経時的な変化が少ない。このような安定な乳化液は作業性に優れているが、添加した油の量にしてはジュシーな食感を得ることができなかった。通常肉中の油脂はこのような乳化液の状態では存在していない。そこで、肉本来のジュシーな食感を得るためには、喫食す

るときに乳化状態が壊れて油脂が非乳化状態で存在することが重要である。具体的に油は100 μ m以上で存在することがジュシーな食肉には求められる。

【0012】一方乳化液の中にある程度の分子量を持った冷水可溶性澱粉分子（ヨウ素で染色される程度の大きさ）を添加すると、保水能力に優れた冷水可溶性澱粉分子は水分子を分子内に保持する。ここでいったん乳化が安定すると考えられるが、いったん可溶化した冷水可溶性澱粉分子はその後の冷凍もしくは冷蔵により老化が始まり、保持していた水を放出する。これにより乳化液中の水と油のバランスが崩れ、また、老化澱粉分子の集合に伴い油滴の集合も加速されるのである。更に加熱によって油と澱粉懸濁液の分離は促進されるため、本発明の乳化液で処理した食肉を喫食するときは乳化が不安定な状態になりそのため食肉にジュシー感が得られると考えられる。

【0013】本発明において使用可能な食肉の種類は牛肉、豚肉、羊肉、山羊肉などの畜肉、鶏肉、アヒル肉、七面鳥肉、ガチョウ肉等の家禽肉などである。使用可能な部位は特に問わないが、牛肉、豚肉ではそもそも肩など、家禽肉では胸肉など繊維質で脂肪分が少なく、加熱調理により縮んだりばさびたりしがちな部位に適用すると、よりジュシー感を与えることができる。

【0014】本発明における食肉加工用の意味するところは、加工時の食肉の形態によらず、食肉の食感もしくは歩留まい向上の目的で食肉と共に用いられる副原料等すべての形態を含む。例えば、大きな肉塊に対しては本乳化液をピクル液としてインジェクターなどを使用して強制的に打ち込むインジェクション法や本乳化液を肉塊を浸すカバー法（湿態浸法）を用いることができる。これらの肉塊をチョッパーやグラインダーなどでミンチ状にし、通常のミキサー、パキーマミキサーもしくは、サイレントカッターなどで本乳化液と混合、整形して使用することもできる。

【0015】本乳化液を用いて製造した食肉加工製品とは、ピクル液として用いた場合は比較的大きな肉塊をそのまま用いた製品、例えば、ハム、焼豚、ローストビーフなど、もしくはこれらの肉塊をスライス、ミンチなどにして加工、調理したもの、例えば、焼き鳥、焼き鳥、ステーキ、トンカツ、ビーフカツ、カレー、シチュー、唐揚げ、酢豚、八宝菜、肉野菜炒めなどを指す。また本乳化液をミンチ状にした肉と混合整形した食肉加工製品としては、ハンバーグ、ソーセージ、餃子、焼売、ミートボール、メンチカツ、コロッケなどの焼肉製品が挙げられる。この場合、ミンチ肉の原料は先に挙げた食肉をそのまま用いても良いが、当乳化液をピクル液として打ち込んだ加工肉を原料にするとも一層ジュシーさが付与される。

【0016】また、本発明において水相に分散または溶解させる澱粉の添加割合は5-20重量%が好ましい。

更に添加する澱粉は、 α 化澱粉と β 澱粉を組み合わせたことが必須であり、その配合比は1:9~5:5の範囲、望ましくは3:7~4:6の範囲がよい。 α 化澱粉の比率が多いとビッケル液が増粘し、肉中への分散性が悪くなったり、加熱調理時のドリップが多く、ともすれば油っぽい食感になってしまふ。 β 澱粉の比率が多いと冷蔵もしくは冷凍保存時に老化による頑固的な乳化的破壊が起こらず加熱調理時に乳化した状態のまま肉中に固定化してしまうので、ジューシーな食感が得られない。

【0017】また、本発明に用いられる α 化澱粉の製造には従来から知られているようなジェットクーラー処理、ドラムドライヤー処理、エクストルーダー処理などが用いられる。また、原料となる澱粉種、加工法は特に問わないが望ましくは絶乾物10%水溶液または水分散液のB型粘度が200cps以下の α 化澱粉がよい。このような α 化澱粉はビッケル液への添加により増粘せず都合がよい。また、低温保存により老化しやすいため、油脂と共に乳化液として食肉に注入した場合、老化による乳化的不安定化が進みやすいと考えられる。B型粘度が200cpsより大きいとビッケル粘度が上昇し、作業性に問題を生じる可能性がある。

【0018】本発明において β 澱粉はアミロースもしくはアミロペクチンの結晶構造を有する澱粉粒と定義され、加熱調理時に膨潤、ゲル化し、加熱時のドリップを抑える目的で添加されるため通常の食肉製品の加熱条件（達温75℃以上）で糊化を開始する澱粉であれば特に澱粉種、加工法を問わず使用できる。例えば、馬鈴薯澱粉、小麦澱粉、タピオカ澱粉、甘藷澱粉、コーンスターチ、ハイアミロースコーンスターチ、ワキシーコーンスターチ、米澱粉等である。この様な β 澱粉をさらにエステル化、エーテル化、架橋化、またはこれらの方法を組み合わせて得られる加工澱粉を用いることができる。

【0019】本発明において使用する油脂も食用として用いられているものならば特に限定されないが融点が40℃以下であることが望ましい。例えば、菜種油、大豆油、ひまわり油、綿実油、落花生油、とうもろこし油、サフラワーズ、オリーブ油、胡麻油、ぶどう種子油、やし油、パームなどの食用に供される植物性油脂もしくはこれらを分別し、または水素添加したもの、およびそれらの混合物を用いることも可能である。そのなかでもパーム油を多量分画したパームスーパーオレインやパームダブルオレインが望ましい。必要に応じて油溶性着色料、油溶性香料、油溶性ビタミン、シーズニングオイルを油脂に混ぜたものも使用することができる。融点が40℃を超える油脂、例えば牛脂（融点45℃）などは、 α 澱粉の老化に抗して、乳化した状態が安定なため加熱調理後の食感がジューシーになりにくい。このような融点の高い油脂は融点の低い他種の油脂と混合することにより使用できる。

【0020】油脂の割合は水中油脂乳化が安定に行われ

るように本発明の水中油滴型乳化液に対し10~50重量%が好ましい。10重量%より少ないと油脂の添加効果が乏しく、50重量%を超えると乳化安定性が悪くなるからである。水中油滴型乳化液は水溶性成分を水に溶解した水層部を攪拌しながら油溶性成分を食用油脂に溶解した油相部を徐々に添加して乳化することによって製造される。乳化液の製造方法は特に限定されず、ホモミキサー、ホモジェナイザー、コロイドミル等の公知の水中油滴型乳化物製造器を用いて製造できる。

【0021】乳化剤および乳化安定剤としては、例えばカゼインナトリウム、大豆蛋白質、卵黄、卵白、乳蛋白質などの蛋白質類、キサンタンガム、アラビアガム、結晶セルロース、親油性澱粉等の多糖類、グリセリル脂肪酸エステル、ソルビタン脂肪酸エステル、プロピレングリコール脂肪酸エステル、シオ糖脂肪酸エステル、レシチン、サポニン等の界面活性剤を用いることができるが、望ましくは本発明におけるビッケルの特性に合うような親油性澱粉、更に望ましくはこれらの親油性澱粉を乳化性を失わずに程度に加水分解したものや糖化したものが適している。ここに挙げる親油性澱粉とは、乳化能をもつように加工された澱粉で、具体的にはオクチニルコハク酸エステル化澱粉が知られている。親油性澱粉の乳化液中の割合は通常0.5%~1.0%望ましくは1%~5%程がよい。0.5%以下だとビッケル液調整時の乳化安定性に乏しく、1.0%より多く添加すると、ビッケル粘度が上昇し、作業性に問題を生じる可能性がある。

【0022】

【実施例】以下に本発明の実施例、比較例をあげ本発明を更に具体的に説明するが、本発明はこれらにより限定されるものではない。尚、例中の「%」は特記しない限り重量基準である。

【0023】

【実施例1】表1の組成配合で以下の方法により水中油滴型乳化液を調製した。20℃の水に β 澱粉としてアクトボディTP-2、3.5g、 α 化澱粉としてジェルコールA H-F（いずれもホーネンコーポレーション製）1.5g、乳化剤として親油性澱粉（オクチニルコハク酸エステル化澱粉）0.5gを順次加入、よく分散させた。その後30℃に保った油脂HOP100SO（パームスーパーオレイン、ホーネンコーポレーション製）100gを徐々に加入し、「T.K.ホモミキサー」（特殊機械工業株式会社製）を用いて5000rpmで攪拌させた。最後に、食塩および砂糖をそれぞれ10g加入、全体を500gに調整し、水中油滴型乳化液を得た。

【0024】

【比較例1】乳化剤を使用せず実施例1の条件と同様にビッケル液の調整を試みた。しかし、調整後も多量に油相と水層が分離し、安定な水中油滴型乳化液を作成することができなかった。そのため以下の実施例、比較例はいずれも親油性澱粉を乳化剤として使用すること

する。

【0025】

【比較例2】比較例2としてHOP100SOの配合量をすべて水に置き換えてビッケル液を調製した。

【0026】

【比較例3】比較例3としてジェルコールAH-Fの全*

*量を水に置き換え、ビッケル液を作成した。

【0027】

【比較例4】比較例4としてアクトボディTP-2の全量を水に置き換え、水中油滴型乳化液を作成した。

【0028】

【表1】

		実施例1	比較例1	比較例2	比較例3	比較例4
油類	HOP100SO	20.0	20.0		20.0	20.0
β 澱粉	アクトボディTP-2	7.0	7.0	7.0		7.0
α 化澱粉	ジェルコールAH-F	3.0	3.0	3.0	3.0	
乳化剤	親油性澱粉	0.5		0.5	0.5	0.5
	炭酸	2.0	2.0	2.0	2.0	2.0
	砂糖	2.0	2.0	2.0	2.0	2.0
	水	65.5	66.0	65.5	72.5	68.5
官能試験結果(-1~5)						
	ジュースーさ	4.5		1.8	2.2	1.7
	風味	4.2		2.4	2.0	2.3
	総合評価	8.7		4.2	4.2	4.0

【0029】実施例1及び比較例2~4で調製した水中油滴型乳化液およびビッケル液500gを、皮を除去し、50~60gに切断した鶏胸肉1kgとともにロータリータンブラー（大道産業製）にいれ、600mmHgまで吸気した後、12rpm、10℃で1時間タンブリングを行った。つぎに、タンブリングを行った鶏胸肉は一晩5℃の冷蔵庫で保存した後、小麦粉にまぶし、170~180℃に熱した植物油で5分加熱し唐揚げを作成した。これらの唐揚げは、-18℃の冷凍庫で一晩保存した後、電子レンジで再加熱し、10名のパネラーで風味試験評価した。官能試験評価はジュースー感と風味を7段階評価（-1~5）し、その平均値を表1に示した。その結果、ビッケル液中に α 化澱粉と β 澱粉を加え、油と共に乳化させたビッケル液はそのいずれかを欠いた比較例に比べてジュースーであることがわかる。

【0030】

【実施例2】表2の組成配合で実施例1の方法にない水中油滴型乳化液を調製した。 β 澱粉としてジェルコールW-7、 α 化澱粉としてジェルコールW- α （いずれもホーネンコーポレーション製）、油脂としてエクストラバージンオリーブオイル（融点3℃、ホーネンコーポレーション製）を使用したものを本発明品とした。ホワイテッパ、グルタミン酸Na、ポリリン系制菌剤

は食塩と共に、乳化液調整後最後に添加溶解させた。

【0031】

【実施例3】実施例2においてエクストラバージンオリーブオイルを使う代わりにコーン油（融点-10℃、）を使用して同様に水中油滴型乳化液を調製した。

【0032】

【実施例4】実施例2においてエクストラバージンオリーブオイルを使う代わりに牛脂（融点45℃）を使用して同様に水中油滴型乳化液を調製した。

【0033】

【実施例5】実施例2において親油性澱粉を使う代わりにカゼインNaを使用して同様に水中油滴型乳化液を調製した。

【0034】

【実施例6】実施例1においてジェルコールW- α （ α 化澱粉）とジェルコールW-7（ β 澱粉）の配合比を変更し、同様に水中油滴型乳化液を調製した。

【0035】

【比較例5】比較例としてエクストラバージンオリーブオイルの配合量をすべて水に置き換えてビッケル液を調製した。

【0036】

【表2】

項目	単位	平均	標準偏差	最大値	最小値	中央値	対称性
2022年11月20日(土)の平均気温	度C	10.0	2.0	14.0	6.0	10.0	0.0
2022年11月20日(土)の最高気温	度C	14.0	2.0	16.0	12.0	14.0	0.0
2022年11月20日(土)の最低気温	度C	6.0	2.0	8.0	4.0	6.0	0.0
2022年11月20日(土)の平均湿度	%	75	10	85	65	75	0.0
2022年11月20日(土)の平均風速	m/s	2.0	0.5	2.5	1.5	2.0	0.0
2022年11月20日(土)の平均降水量	mm	0.0	0.0	0.0	0.0	0.0	0.0
2022年11月20日(土)の平均日照時間	時間	1.0	0.5	1.5	0.5	1.0	0.0
2022年11月20日(土)の平均雲量	%	75	10	85	65	75	0.0
2022年11月20日(土)の平均気圧	hPa	1013	1.0	1015	1011	1013	0.0
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2022年11月20日(土)の平均雲量	%	75	10	85	65	75	0.0
2022年11月20日(土)の平均気圧	hPa	1013	1.0	1015	1011	1013	0.0
2022年11月20日(土)の平均湿度	%	75	10	85	65	75	0.0
2022年11月20日(土)の平均風速	m/s	2.0	0.5	2.5	1.5	2.0	0.0
2022年11月20日(土)の平均降水量	mm	0.0	0.0	0.0	0.0	0.0	0.0
2022年11月20日(土)の平均日照時間	時間	1.0	0.5	1.5	0.5	1.0	0.0
2022年11月20日(土)の平均雲量	%	75	10	85	65	75	0.0
2022年11月20日(土)の平均気圧	hPa	1013	1.0	1015	1011	1013	0.0
2022年11月20日(土)の平均湿度	%	75	10	85	65	75	0.0
2022年11月20日(土)の平均風速	m/s	2.0	0.5	2.5	1.5	2.0	0.0
2022年11月20日(土)の平均降水量	mm	0.0	0.0	0.0	0.0	0.0	0.0
2022年11月20日(土)の平均日照時間	時間	1.0	0.5	1.5	0.5	1.0	0.0
2022年11月20日(土)の平均雲量	%	75	10	85	65	75	0.0
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2022年11月20日(土)の平均湿度	%	75	10	85	65	75	0.0
2022年11月20日(土)の平均風速	m/s	2.0	0.5	2.5	1.5	2.0	0.0
2022年11月20日(土)の平均降水量	mm	0.0	0.0	0.0	0.0	0.0	0.0
2022年11月20日(土)の平均日照時間	時間	1.0	0.5	1.5	0.5	1.0	0.0
2022年11月20日(土)の平均雲量	%	75	10	85	65	75	0.0
2022年11月20日(土)の平均気圧	hPa	1013	1.0	1015	1011	1013	0.0
2022年11月20日(土)の平均湿度	%	75	10	85	65	75	0.0
2022年11月20日(土)の平均風速	m/s	2.0	0.5	2.5	1.5	2.0	0.0
2022年11月20日(土)の平均降水量	mm	0.0	0.0	0.0	0.0	0.0	0.0
2022年11月20日(土)の平均日照時間	時間	1.0	0.5	1.5	0.5	1.0	0.0
2022年11月20日(土)の平均雲量	%	75	10	85	65	75	0.0
2022年11月20日(土)の平均気圧	hPa	1013	1.0	1015	1011	1013	0.0
2022年11月20日(土)の平均湿度	%	75	10	85	65	75	0.0
2022年11月20日(土)の平均風速	m/s	2.0	0.5	2.5	1.5	2.0	0.0
2022年11月20日(土)の平均降水量	mm	0.0	0.0	0.0	0.0	0.0	0.0
2022年11月20日(土)の平均日照時間	時間	1.0	0.5	1.5	0.5	1.0	0.0
2022年11月20日(土)の平均雲量	%	75	10	85	65	75	0.0
2022年11月20日(土)の平均気圧	hPa	1013	1.0	1015	1011	1013	0.0
2022年11月20日(土)の平均湿度	%	75	10	85	65	75	0.0
2022年11月20日(土)の平均風速	m/s	2.0	0.5	2.5	1.5	2.0	0.0
2022年11月20日(土)の平均降水量	mm	0.0	0.0	0.0	0.0	0.0	0.0
2022年11月20日(土)の平均日照時間	時間	1.0	0.5	1.5	0.5	1.0	0.0
2022年11月20日(土)の平均雲量	%	75	10	85	65	75	0.0
2022年11月20日(土)の平均気圧	hPa	1013	1.0	1015	1011	1013	0.0
2022年11月20日(土)の平均湿度	%	75	10	85	65	75	0.0
2022年11月20日(土)の平均風速	m/s	2.0	0.5	2.5	1.5	2.0	0.

【0037】

【実施例6】実施例2-6で調製した水中油乳液型乳化液を使用し一晩冷蔵凍解されたインゲン豚ロース肉（食肉加工業者より購入）2 kg にインゲンチューブ（トニー製スーパーインジェクター-TN-SP18）を用いて13.0%（肉重量の3.0%のピクルス液を加える）インゲンジョシントした。その後ロータリータンブラー（大道産業製）を用いて、600 mmHg で真空した後、12 f p m、10℃で90分タンピングを行った。タンピングが終わったロース肉は、ケースに入れ18℃で一晩凍結し、再び0℃まで解凍した後、ハムスライサー（花木製作所製）で厚さ1 cm、重量80 g に整形した。このように整形されたポーション肉は-18℃の冷凍庫で一晩保存した後、小麦粉、液卵、白粉をつけ170℃の大豆油で6分フライし、トンカツを完成した。これらのトンカツは、10名のパネラーでジュース感と風味を7段階評価（-1～5）し、その平均値を表2に示した。また、フライ前後の重量変化を測定し、加熱歩率と*

*した。さらに加熱したトンカツを十分さまし、衣を剥がして肉の硬さをテクスチャロメーター（General Electric社製）で測定した。測定条件は、肉の中心高さを2 cm四方に切り取り円筒形ミ製のプランジャーで2回咀嚼試験を行い、硬さを求め、それぞれの値を表として示す。その結果、実施例2～6のビツクル液で調製したトンカツはいずれも、比較例5のビツクル液で調製したトンカツより歩留、食感のジョーシキとも優れていた。特に実施例2のビツクル液で作成したトンカツは、歩留、食感および風味に優れていることが分かる。

【0038】

【発明の効果】以上の実施例から明らかなように、本発明の水の中油滴型乳化液は食肉製品にピクル液として用いた場合、 α 化澱粉が乳化状態の油脂に作用し、且つ加熱による油脂のドリップを β 澱粉が抑えるため、よりジューシーな食感を付与することができる。

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(54) OIL-IN-WATER DROP TYPE EMULSIFIED LIQUID FOR PROCESSING MEAT,
PROCESSED MEAT PRODUCT IN WHICH THE EMULSIFIED LIQUID IS INJECTED AND ITS
PRODUCTION

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain an oil-in-water drop type emulsified liquid for processing meat, capable of inhibiting the drip of fats and oils due to heating, capable of imparting a more juicy palatability to the processed meat product than by conventional methods, and capable of improving the palatability and flavor of the processed meat product by adding a fat or oil, a mixture containing gelatinized starch, and an emulsifier.

SOLUTION: This oil-in-water drop type emulsified liquid contains (A) 10-50 wt.% of an edible fat or oil, such as rapeseed oil, having a melting point of -20 to 40° C. (B) 5-20 wt.% of a mixture of gelatinized starch with beta-starch, and (C) an emulsifier such as a lipophilic starch, e.g. starch octenyl succinate ester, preferably in an amount of 1-5 wt.%. The gelatinized starch has a B type viscosity of ≤200 cps in the form of a 10% aqueous solution or aqueous dispersion of absolutely dried starch. The gelatinized starch and the beta-starch are preferably mixed in a ratio of 1/9 to 5/5. The oil-in-water drop type emulsified liquid is preferably injected into a processed meat product.

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CLAIMS

[Claim(s)]

[Claim 1]Meat-processing service-water middle oil drop type emulsified liquid by which 5 to 20 weight % and an emulsifier being included for a mixture of 10 to 50 weight % of oil and fat content and pregelatinization starch, and beta starch

[Claim 2]The meat-processing service-water middle oil drop type emulsified liquid according to claim 1 in which pregelatinization starch is characterized by B type viscosity of 10% of bone-dry thing solution or a water dispersion being pregelatinization starch of 200 cps or less.

[Claim 3]The meat-processing service-water middle oil drop type emulsified liquid according to claim 1 or 2, wherein an emulsifier is oleophilic starch.

[Claim 4]Meat-processing service-water middle oil drop type emulsified liquid of Claims 1-3, wherein compounding ratios of pregelatinization starch and beta starch are 1.9-5.5 given in any 1 clause.

[Claim 5]Meat-processing service-water middle oil drop type emulsified liquid of Claims 1-4 using edible oil and fat whose melting point is -20 ** -40 ** as fats and oils given in any 1 clause.

[Claim 6]Meat-processing products produced by pouring in the oil in water type emulsified liquid according to claim 1 to 5.

[Claim 7]A manufacturing method of meat-processing products pouring in the oil in water type emulsified liquid according to claim 1 to 5.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the meat-processing service-water middle oil drop type emulsified liquid which manufactures the meat-processing products excellent in mouthfeel and cooking yield after processing. It is related with a meat-processing product manufactured using the pickling liquid which uses the meat-processing service-water middle oil drop type emulsified liquid concerned, and a manufacturing method for the same.

[0002]

[Description of the Prior Art] Chickens holding moderate moisture and moderate oil and fat content, such as meat, such as a cow and a pig, a hen, and a duck, can enjoy juicy mouthfeel with a suitable subsequent circulation form and a cooking method. However, the state of meat changes with the circulation states after growth environment, a part, and prime meat also with the same meat. There are some from which the original juiciness of meat is spoiled from the first by the part firmly appropriate for a muscle, the drip produced at the time of cooking of severe circulation forms, such as refrigeration, and after that, etc., and commodity value falls especially. Therefore, it is not based on the part of meat, a circulation form, growth environment, etc., but improvement which can carry out skilled [of the delicacy of meat] enough is desired.

[0003] Conventionally, some improvement of such meat products and processing methods were [various kinds of] To a meat block, for example, enzymes, such as protein, polysaccharide, starch, and protease. Added combining one kind or two kinds or more in a surface-active agent etc. Use what is called what is called pickling liquid, powdered oil, a liquefied oil, solid fat, etc. are directly added to little meat, or flavor, mouthfeel, a heating drip, etc. have been improved an oil-in-water type, a water-in-oil type, and by pouring in an oil-in-water Nakamizu type emulsion further.

[0004] For example, a method of pouring in a thermal coagulation nature protein solution in JP, S59-162853, A, At JP, H1-144961, A, what added oleophilic starch or waxy cornstarch to the emulsified matter of soybean protein and fats and oils is indicated by the method of adding a protein coagulant in the heated protein, and JP, H8-107760, A. However, it will form lumps at the time of pickling liquid adjustment, and will be hard to distribute in liquid, the viscosity of pickling liquid will become high further, and the method of pouring in foreign proteins other than meat will hold air bubbles, although the good heating yield is obtained. Therefore, in order to obtain uniform pickling liquid, a defoaming process must be taken, and it becomes a cause from which productive efficiency falls. Although a protein raw material forms hard gel, it will be dry mouthfeel without a different juicy feeling from meat. Since a protein raw material had different flavor from meat products, there was a fault of reducing a flavor.

[0005] The processed raw meat which used together concomitant use of curdlan and a thickening agent in JP, H5-260927, A, and used together a gel plasticity amylolysis thing and gel anthesis sugar in JP, H8-128404, A, and the processed raw meat which used starch and dextrin together in JP, H10-99051, A are indicated. However, when polysaccharide, such as curdlan, is added, there is no different taste like protein, but. By concentration which raises a gel strength, since the viscosity of a pickle became very high, the bubble in the

pickling liquid which a burden is placed on an injector and produced for high viscosity remained in meat, and there was a problem in operativity, like a cavity arises in a final product. Although mouthfeel becomes hard, it cannot take out juiciness. Since the good heating yield is obtained and it does not have flavor in itself if the pickling liquid which added only starch and an amylolysis thing is used, the flavor of meat products is not impaired, but this does not need to take out juiciness, either.

[0006]Therefore, adding powdered oil, a liquefied oil, solid fat, etc. to pickling liquid directly, and giving a certain amount of juicy feeling to meat is known. For example, a method of carrying out the heating and dissolving of the fats and oils, and pouring them in directly as pickling liquid (JP,S60-41467,A), The thing (JP,H6-253782,A) about the method (JP,S59-162853,A) of pouring in water-in-oil type emulsified liquid as pickling liquid, and the water-in-oil type emulsified matter containing three or less HLB sucrose unsaturation fatty acid ester is known. However, according to the method of pouring in water-in-oil type emulsified liquid as pickling liquid, in order to almost elute a certain amount of juicy feeling after the fats and oils poured in although obtained cooking by heating, it is insufficient as a mouthfeel improvement effect. When using fats and oils with the high melting point, in order to have to heat and use at the temperature more than the melting point of fats and oils, there was a sanitary problem.

[0007]The method (JP,S8-89161,A) of pouring in oil in water type emulsified liquid as pickling liquid, Drive in oil in water type emulsified liquid to meat with thermal coagulation nature protein, and it fixes by cooking. The thing about the method of manufacturing a ham product with a marbled beef-like organization (JP,H4-341159,A), After including in meat the emulsion containing thermal coagulation nature proteins, such as soybean protein, it is proposed also about the manufacturing method (JP,H9-266769,A) of the meat products produced by making demulsificate by low-temperature maintenance. However, the method of pouring in oil in water type emulsified liquid as pickling liquid as it is had the problem that the yield at the time of cooking was not good etc., although the juicy feeling has improved to some extent. According to the method of pouring in oil in water type emulsified liquid as pickling liquid with thermal coagulation nature protein, the oil droplet was fixed in meat with thermal coagulation nature protein, and was insufficient for giving a juicy feeling for addition concentration of fats and oils. There were problems, like the different taste of protein impairs the flavor of meat.

[0008]this invention person has proposed for the purpose of mouthfeel improvement of meat previously about use to the meat products of the pickle (JP,H9-308462,A) which used together the chilled water soluble starch by which concomitant use (JP,H7-271721,A) and limited decomposition were carried out and beta starch of modified starch and a thickening agent. Although these invention was excellent in workability and effective in the ability to acquire soft texture economically, there was also a point which should be improved in compensating the original juiciness of meat.

[0009]

[Means for solving problem]The result of having repeated research wholeheartedly in order that this invention person might improve softly juicy the meat which is hard and is not juicy since [many / the amount of fiber] it is small, By pouring in the oil-in-water type emulsified liquid which made the oil phase part and the water phase part which made the starch mixture containing pregelatinization starch suspend emulsify with an emulsifier as pickling liquid, it found out that the meat-processing products which have the original juiciness of meat at the time of cooking could be obtained, and this invention was completed.

[0010]Namely, this invention is a thing about the meat-processing service-water middle oil drop type emulsified liquid which emulsified the aqueous suspension which made the pregelatinization starch and beta starch which had edible oil and fat and a certain fixed degree of swelling in meat dispersion-stability-ize with an emulsifier like oleophilic starch, It is related with meat products manufactured using the pickling liquid which uses the meat-processing service-water middle oil drop type emulsified liquid concerned, and the oil in water type pickling liquid concerned, and a manufacturing method for the same.

[0011]Although the mechanism of action which gives a juicy feeling to meat does not have certain oil in water type emulsified liquid by this invention, it is guessed as the following It

is considered to sense the oil of meat or the oil-soluble flavor, and the taste substance to sense that it is juicy, when meat is eaten. In that case, it is influenced greatly whether the size of the emulsified oil droplet is juicy. Generally, when emulsification is stable, the size of an oil droplet is small and there is little temporal change. Although such stable emulsified liquid was excellent in workability, mouthfeel juicy for a quantity of the added oil was not able to be obtained. Usually, the fats and oils in meat do not exist in the state of such emulsified liquid. So, in order to obtain original juicy mouthfeel of meat, when eating, it is important that an emulsified state breaks and fats and oils exist by a non-emulsified state. Meat with juicy **** specifically existing at not less than 100micro is asked.

[0012]If the chilled water soluble starch molecule (size of the grade dyed with iodine) which, on the other hand, had a certain amount of molecular weight in emulsified liquid is added, the chilled water soluble starch molecule excellent in water retention capability will hold a water molecule to intramolecular. Although it is thought that emulsification is once stabilized here, aging starts by subsequent refrigeration or refrigeration, and the once solubilized chilled water soluble starch molecule emits the water currently held. The water in emulsified liquid and the balance of an oil collapse by this, and a set of an oil droplet is also accelerated with a set of an aging starch molecule. Since separation of an oil and starch suspension is promoted by heating, when eating the meat processed with the emulsified liquid of this invention, it will be in a state with unstable emulsification, therefore it will be thought that a juicy feeling is obtained by meat.

[0013]In this invention, the kinds of usable meat are poultry meat, such as meat, such as beef, pork, mutton, and chevon, chicken, duck meat, turkey meat, and goose meat, etc. Although an usable part in particular is not asked, if ** is applied to the part which a mist shoulder etc. tend to be fatless at fibers, such as a breast fillet, and tends to shrink with poultry meat by cooking, or tends to get dry, with beef and pork, a juicy feeling can be given more.

[0014]The place meant for meat processing in this invention is not based on the form of the meat at the time of processing, but includes the forms of all the auxiliary materials used with meat for mouthfeel of meat, or the purpose of the improvement in the yield. For example, can use the covering method (the ***** method) for dipping a lump of flesh for the injection method compulsorily driven in by using this emulsified liquid as pickling liquid to a big lump of flesh using an injector etc., or this emulsified liquid, and. These lumps of flesh are made into the shape of minced meat by chopper, a grinder, etc., and it can also be used with a usual mixer, a vacuum mixer, or a silent cutter etc., being able to mix [this emulsified liquid and] and operating orthopedically.

[0015]With the meat-processing products manufactured using this emulsified liquid. The product using the lump of flesh comparatively big when it uses as pickling liquid as it is, For example, what a ham, roast pork, roast beef, etc. used these lumps of flesh as a slice, minced meat, etc., and was processed and cooked, for example, roast meat, yakitori, a steak, a pork cutlet, a beef cutlet, curry, a stew, frying without coating, sweet-and-sour pork, chop suey, meat stir-fried vegetables, etc. are pointed out. As meat-processing products which carried out mixed plastic surgery with the meat which made this emulsified liquid the shape of minced meat, ground meat products, such as a hamburger, a sausage, a Chinese meat dumpling, a steamed meat dumpling, a meatball, a fried cake of minced meat, and a croquette, are mentioned. In this case, although the raw material of minced meat may use the previously quoted meat as it is, if processed meat which drove in this emulsified liquid as a pickle is used as a raw material, juiciness will be given further.

[0016]As for the addition rate of the starch distributed or dissolved in the aqueous phase in this invention, 5 to 20 weight % is preferred. furthermore -- as for the starch to add, it is indispensable to combine pregelatinization starch and beta starch -- the compounding ratio -- the range of 1.9-5.5 -- the range of 3.7-4.6 is desirably good. If there are many ratios of pregelatinization starch, pickling liquid will thicken, the dispersibility to the inside of meat will worsen, or the drip at the time of cooking will be many and sometimes oily mouthfeel. Since destruction of the positive emulsification by aging does not take place at the time of refrigeration or frozen storage but it fixes in meat with an emulsified state at the time of cooking if there are many ratios of beta starch, juicy mouthfeel is not

continued.

[0017] Jet cooker processing, drum dryer processing, extruder processing, etc. in which it is known from the former are used for manufacture of the pregelatinization starch used for this invention. Although in particular the starch kind and the processing method used as a raw material are not asked, their pregelatinization starch of 200 cps or less is [the B type viscosity of 10% of bone-dry thing solution, or a water dispersion] desirably good. Such pregelatinization starch is not thickened by addition to pickling liquid, but is convenient. Since it is easy to age by cold storage, when it pours into meat as emulsified liquid with fats and oils, it is thought that it is easy to follow destabilization of emulsification by aging. If B type viscosity is larger than 200 cps, pickle viscosity may rise and a problem may be produced in workability.

[0018] In this invention, beta starch is defined as the starch granule which has a crystal structure of amylose or amylopectin. It swells and gels at the time of cooking, and since it is added in order to stop the drip at the time of heating, especially if it is starch which starts gelatinization on the heating conditions (not less than 75 °C of temperature rises) of the usual meat product, it can be used regardless of a starch kind and the processing method. For example, they are potato starch, amylosum tritici, a tapioca starch, sweet potato starch, cornstarch, high amylose cornstarch, waxy cornstarch, amylosum oryzae, etc. The modified starch further obtained combining esterification, etherification, bridge-construction-izing, or these methods in such beta starch can be used.

[0019] Especially if the fats and oils used in this invention are also used as edible, it will not be limited, but it is desirable for the melting point to be 40 °C or less. For example, oleum rapae, soybean oil, sunflower seed oil, cottonseed cake oil, peanut oil, corn oil, it is also possible to use the things which classified or hydrogenated vegetable fat and oil or these with which edible [such as safflower oil, olive oil, sesame oil, grape seed oil, coconut oil, and a palm,] is presented, and those mixtures. The palm super olein and palm double olein which drew palm oil by multistage also in it are desirable. What mixed an oil-soluble coloring agent, oil-soluble perfume, an oil-soluble vitamin, and seasoning oil with fats and oils if needed can be used. Fats and oils with the melting point of greater than 40 °C, for example, beef tallow, (melting point of 45 °C) resist aging of alpha starch, and since the emulsified state is stable, mouthfeel after cooking cannot become juicy easily. The fats and oils with such the high melting point can be used by mixing with the fats and oils of other type with the low melting point.

[0020] As for a rate of fats and oils, 10 to 50 weight % is preferred to oil in water type emulsified liquid of this invention so that oil-in-water fat emulsification may be performed stably. It is because the addition effect of fats and oils is scarce when less than 10 weight %, and emulsion stability will worsen if 50 weight % is exceeded. Oil in water type emulsified liquid is manufactured from adding gradually and emulsifying an oil phase part which dissolved an oil-soluble ingredient in edible oil and fat, stirring a water layer part which dissolved water-soluble materials in water. A manufacturing method in particular of emulsified liquid is not limited, but can be manufactured using publicly known oil in water type emulsified matter manufacture machines, such as a homomixer, a homogenizer, and a colloid mill.

[0021] As an emulsifier and emulsion stabilizer, for example Casein sodium, soybean protein, Proteins, such as an egg yolk, an egg white, and milk protein, xanthan gum, gum arabic, Although surface-active agents, such as polysaccharide, such as crystalline cellulose and oleophilic starch, a glycerine fatty acid ester, a sorbitan fatty acid ester, propylene glycol fatty acid ester, sucrose fatty acid ester, lecithin, and saponin, can be used, Oleophilic starch which suits the characteristic of a pickle in this invention desirably, a thing which hydrolyzed these oleophilic starch into a grade which does not lose emulsifiability still more desirably, and a gelatinized thing are suitable. Oleophilic starch mentioned here is the starch processed so that it might have emulsification ability, and octenylsuccinate-ized starch is specifically known. A rate in emulsified liquid of oleophilic starch is usually desirably as good as 1% - 5%, 0.5% - 10%. When it is 0.5% or less, it is lacking in emulsion stability at the time of pickling liquid adjustment, and if it adds mostly from 10%, pickle viscosity may rise and a problem may be produced in workability.

[0022]

[Working example] This invention is not limited by these, although the embodiment of this invention and a comparative example are raised to below and this invention is explained to it still more concretely. "%" in an example is a weight reference unless it mentions specially.

[0023]

[Work example 1] Oil in water type emulsified liquid was prepared by the following methods by presentation combination of Table 1. Gell call AH-F (all are the HONEN Corporation make) 15g was added as act body TP-2, 35 g, and pregelatinization starch as beta starch, 0.5 g of oleophilic starch (octenylsuccinate-ized starch) was added to 20 ** water one by one as an emulsifier, and it was made to often distribute. Fats-and-oils HOP100SO (palm super olein, HONEN Corporation make) 100g kept at 30 ** after that was added gradually, and it was made to stir at 5000 rpm using "T. K. gay mixer" (made by special opportunity-ized industrial incorporated company). Finally, salt and 10g of sugar were added, respectively, the whole was prepared to 500 g, and oil in water type emulsified liquid was obtained.

[0024]

[Comparative example 1] Preparation of pickling liquid was tried like the conditions of Embodiment 1, without using an emulsifier. However, an oil phase and a water layer were not able to dissociate soon after adjustment, and stable oil in water type emulsified liquid was not able to be created. Therefore, suppose that each uses oleophilic starch as an emulsifier in the following embodiments and a comparative example.

[0025]

[Comparative example 2] All the loadings of HOP100SO were transposed to water as the comparative example 2, and pickling liquid was prepared.

[0026]

[Comparative example 3] The whole quantity of gell call AH-F was transposed to water as the comparative example 3, and pickling liquid was created.

[0027]

[Comparative example 4] The whole quantity of act body TP-2 was transposed to water as the comparative example 4, and oil in water type emulsified liquid was created.

[0028]

[Table 1]

表1		実施例1	比較例1	比較例2	比較例3	比較例4
油脂	HOP100SO	20.0	20.0	20.0	20.0	20.0
β 澱粉	アクトボディTP-2	7.0	7.0	7.0		7.0
α 化澱粉	ジェルコールAH-F	3.0	3.0	3.0	3.0	
乳化剤	親油性澱粉	0.5		0.5	0.5	0.5
	食塩	2.0	2.0	2.0	2.0	2.0
	砂糖	2.0	2.0	2.0	2.0	2.0
	水	65.5	66.0	85.5	72.5	83.5
	官能試験結果(-1~5)					
	ジューシーさ	4.5		1.8	2.2	1.7
	風味	4.2		2.4	2.0	2.3
	総合評価	8.7		4.2	4.2	4.0

[0029] The oil in water type emulsified liquid and the pickling liquid 500g which were prepared by Embodiment 1 and the comparative examples 2-4, After having removed the hide, putting into the rotary tumbler (product made from the Omichi industry) with 1 kg of chicken breast cut to 50-60g and inhaling to 600mmHg, the tumbling was performed at 12 rpm and 10 ** for 1 hour. Next, after saving overnight the chicken breast which performed the tumbling in a 5 ** refrigerator, it was sprinkled on wheat flour, was heated for 5 minutes with the vegetable oil heated at 170 to 180 **, and created frying without coating. After saving these frying without coating with a -18 ** freezer overnight, it was reheated with the microwave oven and flavor test evaluation was carried out by ten persons' panelist. Organoleptics evaluation carried out seven-step evaluation (-1-5) of a juicy feeling and the flavor, and showed the average value in Table 1. As a result, pregelatinization starch and beta starch are added into pickling liquid, and it turns out that the pickling liquid made to emulsify with an oil is juicy compared with the comparative

example lacking in the either.

[0030]

[Work example 2] It learned from the method of Embodiment 1 by presentation combination of Table 2, and oil in water type emulsified liquid was prepared. What used gell call W-alpha (all are the HONEN Corporation make) as the gell call W-7 and pregelatinization starch as beta starch, and uses an extra-virgin olive oil (melting point of 3 **, HONEN Corporation make) as fats and oils was used as this invention article. White pepper, glutamic-acid Na, and a polylysine system sterilization agent made the last after emulsified liquid adjustment carry out the addition dissolution with salt.

[0031]

[Work example 3] Oil in water type emulsified liquid was similarly prepared using corn oil (melting point - 10 **) instead of using an extra-virgin olive oil in Embodiment 2.

[0032]

[Work example 4] Oil in water type emulsified liquid was similarly prepared using beef tallow (melting point of 45 °C) instead of using an extra-virgin olive oil in Embodiment 2.

[0033]

[Work example 5] Oil in water type emulsified liquid was similarly prepared using casein Na instead of using oleophilic starch in Embodiment 2.

[0034]

[Work example 6] In Embodiment 1, the compounding ratio of gell call W-alpha (pregelatinization starch) and the gell call W-7 (beta starch) was changed, and oil in water type emulsified liquid was prepared similarly.

[0035]

[Comparative example 5] All the loadings of the extra-virgin olive oil were transposed to water as a comparative example, and pickling liquid was prepared.

[0036]

[Table 2]

[illegible]

[0037]

[Work example 6] The oil in water type emulsified liquid prepared in Embodiments 2-6 is used. Injection of the injector (super injector TN-SP18 made from TONICHD) was used and carried out to 2 kg of frozen pork loin (it receives from a meat processor) which carried out stream defrosting overnight 130% (30% of pickling liquid of meat weight is added). After putting into the rear rotor RITAMBURA (product made from the Omichi industry) and inhaling to 600mmHg, the tumbling was performed at 12 rpm and 10 ** for 90 minutes. The sirloin meat which the tumbling finished was put into the case, and after freezing overnight and thawing to 0 ** again at -18 **, it was orthopedically operated in 1 cm in thickness, and weight of 80 g with the ham slice (made in a flavoring, marinating and chubing factory).

and weight of 60 g with the ham slicer (made in a roasting, dress and shreds factory). After saving overnight the portion meat operated orthopedically in this way with a -18 ** freezer, it attached wheat flour, liquid egg, and bread crumbs, carried out fly with 170 ** soybean oil for 6 minutes, and created the pork cutlet. These pork cutlets carried out seven-step evaluation (-1-5) of a juicy feeling and the flavor by ten persons' panelist, and showed the average value in Table 2. The weight change before and behind fly was measured, and it was considered as the heating yield. The pork cutlet furthermore heated was awoke enough, clothes were removed, and the hardness of meat was measured with the texturometer (made by General Electric). The measuring condition cut off the central part of meat for 2 cm around, did the digestion examination twice by the plunger made from circular aluminum, asked for hardness, and showed each value in Table 2. As a result, each pork cutlet prepared with the pickling liquid of Embodiments 2-6 excelled the pork cutlet prepared with the pickling liquid of the comparative example 5 in the juiciness of the yield and mouthfeel. It turns out that the pork cutlet created especially with the pickling liquid of Embodiment 2 is excellent in the yield, mouthfeel, and flavor.

[0038]

[Effect of the Invention] Since pregelatinization starch acts on the fats and oils of an emulsified state and beta starch stops the drip of the fats and oils by heating when it uses for a meat product as pickling liquid, the oil in water type emulsified liquid of this invention can give juicier mouthfeel, so that clearly from the above embodiment.

[Translation done.]

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TECHNICAL FIELD

[Field of the Invention]This invention relates to the meat-processing service-water middle oil drop type emulsified liquid which manufactures the meat-processing products excellent in mouthfeel and cooking yield after processing. It is related with a meat-processing product manufactured using the pickling liquid which uses the meat-processing service-water middle oil drop type emulsified liquid concerned, and a manufacturing method for the same.

[Translation done.]

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PRIOR ART

[Description of the Prior Art]Chickens holding moderate moisture and moderate oil and fat content, such as meat, such as a cow and a pig, a hen, and a duck, can enjoy juicy mouthfeel with a suitable subsequent circulation form and a cooking method. However, the state of meat changes with the circulation states after growth environment, a part, and prime meat also with the same meat. There are some from which the original juiciness of meat is spoiled from the first by the part firmly appropriate for a muscle, the drip produced at the time of cooking of severe circulation forms, such as refrigeration, and after that, etc., and commodity value falls especially. Therefore, it is not based on the part of meat, a circulation form, growth environment, etc., but improvement which can carry out skilled [of the delicacy of meat] enough is desired.

[0003]Conventionally, some improvement of such meat products and processing methods were [various kinds of]. To a meat block, for example, enzymes, such as protein, polysaccharide, starch, and protease. . Added combining one kind or two kinds or more in a surface-active agent etc. Use what is called what is called pickling liquid, powdered oil, a liquefied oil, soild fat, etc. are directly added to little meat, or flavor, mouthfeel, a heating drip, etc. have been improved an oil-in-water type, a water-in-oil type, and by pouring in an oil-in-water Nakamizu type emulsion further.

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EFFECT OF THE INVENTION

[Effect of the Invention]Since pregelatinization starch acts on the fats and oils of an emulsified state and beta starch stops the drip of the fats and oils by heating when it uses for a meat product as pickling liquid, the oil in water type emulsified liquid of this invention can give juicier mouthfeel, so that clearly from the above embodiment.

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MEANS

[Means for solving problem] A result of having repeated research wholeheartedly in order that this invention person might improve softly juicy meat which is hard and is not juicy since [many / the amount of fiber] it is small. By pouring in oil-in-water type emulsified liquid which made an oil phase part and a water phase part which made a starch mixture containing pregelatinization starch suspend emulsify with an emulsifier as pickling liquid, it found out that meat-processing products which have the original juiciness of meat at the time of cooking could be obtained, and this invention was completed.

[0010] Namely, this invention is a thing about meat-processing service-water middle oil drop type emulsified liquid which emulsified aqueous suspension which made pregelatinization starch and beta starch which had edible oil and fat and a certain fixed degree of swelling in meat dispersion-stability-ize with an emulsifier like oleophilic starch. It is related with meat products manufactured using pickling liquid which uses the meat-processing service-water middle oil drop type emulsified liquid concerned, and the oil in water type pickling liquid concerned, and a manufacturing method for the same.

[0011] Although the mechanism of action which gives a juicy feeling to meat does not have certain oil in water type emulsified liquid by this invention, it is guessed as the following. It is considered to sense oil of meat or an oil-soluble flavor, and a taste substance to sense that it is juicy, when meat is eaten. In that case, it is influenced greatly whether a size of an emulsified oil droplet is juicy. Generally, when emulsification is stable, a size of an oil droplet is small and there is little temporal change. Although such stable emulsified liquid was excellent in workability, mouthfeel juicy for a quantity of an added oil was not able to be obtained. Usually, fats and oils in meat do not exist in the state of such emulsified liquid. So, in order to obtain original juicy mouthfeel of meat, when eating, it is important that an emulsified state breaks and fats and oils exist by a non-emulsified state. Meat with juicy **** specifically existing at not less than 100micro is asked.

[0012] If the chilled water soluble starch molecule (size of the grade dyed with iodine) which, on the other hand, had a certain amount of molecular weight in emulsified liquid is added, the chilled water soluble starch molecule excellent in water retention capability will hold a water molecule to intramolecular. Although it is thought that emulsification is once stabilized here, aging starts by subsequent refrigeration or refrigeration, and the once solubilized chilled water soluble starch molecule emits the water currently held. The water in emulsified liquid and the balance of an oil collapse by this, and a set of an oil droplet is also accelerated with a set of an aging starch molecule. Since separation of an oil and starch suspension is promoted by heating, when eating the meat processed with the emulsified liquid of this invention, it will be in a state with unstable emulsification, therefore it will be thought that a juicy feeling is obtained by meat.

[0013] In this invention, the kinds of usable meat are poultry meat, such as meat, such as beef, pork, mutton, and chevon, chicken, duck meat, turkey meat, and goose meat, etc. Although an usable part in particular is not asked, if ** is applied to the part which a mist shoulder etc. tend to be fatless at fibers, such as a breast fillet, and tends to shrink with poultry meat by cooking, or tends to get dry, with beef and pork, a juicy feeling can be given more.

[0014] The place meant for meat processing in this invention is not based on the form of the meat at the time of processing, but includes the forms of all the auxiliary materials

used with meat for mouthfeel of meat, or the purpose of the improvement in the yield. For example, can use the covering method (the ***** method) for dipping a lump of flesh for the injection method compulsorily driven in by using this emulsified liquid as pickling liquid to a big lump of flesh using an injector etc., or this emulsified liquid, and. These lumps of flesh are made into the shape of minced meat by chopper, a grinder, etc., and it can also be used with a usual mixer, a vacuum mixer, or a silent cutter etc., being able to mix [this emulsified liquid and] and operating orthopedically.

[0015]With meat-processing products manufactured using this emulsified liquid. A product using a lump of flesh comparatively big when it uses as pickling liquid as it is, For example, what a ham, roast pork, roast beef, etc. used these lumps of flesh as a slice, minced meat, etc., and was processed and cooked, for example, roast meat, yakitori, a steak, a pork cutlet, a beef cutlet, curry, a stew, frying without coating, sweet-and-sour pork, chop suey, meat stir-fried vegetables, etc. are pointed out. As meat-processing products which carried out mixed plastic surgery with meat which made this emulsified liquid the shape of minced meat, ground meat products, such as a hamburger, a sausage, a Chinese meat dumpling, a steamed meat dumpling, a meatball, a fried cake of minced meat, and a croquette, are mentioned. In this case, although a raw material of minced meat may use previously quoted meat as it is, if processed meat which drove in this emulsified liquid as a pickle is used as a raw material, juiciness will be given further.

[0016]As for an addition rate of starch distributed or dissolved in aqueous phase in this invention, 5 to 20 weight % is preferred. furthermore -- as for starch to add, it is indispensable to combine pregelatinization starch and beta starch -- the compounding ratio -- the range of 1.9-5.5 -- the range of 3.7-4.6 is desirably good. If there are many ratios of pregelatinization starch, pickling liquid will thicken, dispersibility to inside of meat will worsen, or a drip at the time of cooking will be many and sometimes oily mouthfeel. Since destruction of positive emulsification by aging does not take place at the time of refrigeration or frozen storage but it fixes in meat with an emulsified state at the time of cooking if there are many ratios of beta starch, juicy mouthfeel is not obtained.

[0017]Jet cooker processing, drum dryer processing, extruder processing, etc. in which it is known from the former are used for manufacture of pregelatinization starch used for this invention. Although in particular a starch kind and the processing method used as a raw material are not asked, their pregelatinization starch of 200 cps or less [B type viscosity of 10% of bone-dry thing solution, or a water dispersion] desirably good. Such pregelatinization starch is not thickened by addition to pickling liquid, but is convenient. Since it is easy to age by cold storage, when it pours into meat as emulsified liquid with fats and oils, it is thought that it is easy to follow destabilization of emulsification by aging. If B type viscosity is larger than 200 cps, pickle viscosity may rise and a problem may be produced in workability.

[0018]In this invention, beta starch is defined as a starch granule which has a crystal structure of amylose or amylopectin. It swells and gels at the time of cooking, and since it is added in order to stop a drip at the time of heating, especially if it is starch which starts gelatinization on heating conditions (not less than 75 °C of temperature rises) of the usual meat product, it can be used regardless of a starch kind and the processing method. For example, they are potato starch, amylum tritici, a tapioca starch, sweet potato starch, cornstarch, high amylose cornstarch, waxy cornstarch, amylum oryzae, etc. Modified starch further obtained combining esterification, etherification, bridge-construction-izing, or these methods in such beta starch can be used.

[0019]Especially if the fats and oils used in this invention are also used as edible, it will not be limited, but it is desirable for the melting point to be 40 °C or less. For example, oleum rapae, soybean oil, sunflower seed oil, cottonseed cake oil, peanut oil, corn oil, It is also possible to use the things which classified or hydrogenated vegetable fat and oil or these with which edible [such as safflower oil, olive oil, sesame oil, grape seed oil, coconut oil, and a palm,] is presented, and those mixtures. The palm super olein and palm double olein which drew palm oil by multistage also in it are desirable. What mixed an oil-soluble coloring agent, oil-soluble perfume, an oil-soluble vitamin, and seasoning oil with fats and oils if needed can be used. Fats and oils with the melting point of greater than 40 °C, for example, beef tallow, (melting point of 45 °C) resist aging of alpha starch, and since the

emulsified state is stable, mouthfeel after cooking cannot become juicy easily. The fats and oils with such the high melting point can be used by mixing with the fats and oils of other type with the low melting point.

[0020]As for the rate of fats and oils, 10 to 50 weight % is preferred to the oil in water type emulsified liquid of this invention so that oil-in-water fat emulsification may be performed stably. It is because the addition effect of fats and oils is scarce when less than 10 weight %, and emulsion stability will worsen if 50 weight % is exceeded. Oil in water type emulsified liquid is manufactured from adding gradually and emulsifying the oil phase part which dissolved the oil-soluble ingredient in edible oil and fat, stirring the water layer part which dissolved water-soluble materials in water. The manufacturing method in particular of emulsified liquid is not limited, but can be manufactured using publicly known oil in water type emulsified matter manufacture machines, such as a homomixer, a homogenizer, and a colloid mill.

[0021]As an emulsifier and emulsion stabilizer, for example Casein sodium, soybean protein, Proteins, such as an egg yolk, an egg white, and milk protein, xanthan gum, gum arabic, Although surface-active agents, such as polysaccharide, such as crystalline cellulose and oleophilic starch, a glycerine fatty acid ester, a sorbitan fatty acid ester, propylene glycol fatty acid ester, sucrose fatty acid ester, lecithin, and saponin, can be used, Oleophilic starch which suits the characteristic of the pickle in this invention desirably, the thing which hydrolyzed these oleophilic starch into the grade which does not lose emulsifiability still more desirably, and the gelatinized thing are suitable. The oleophilic starch mentioned here is the starch processed so that it might have emulsification ability, and octenylsuccinate-ized starch is specifically known. The rate in the emulsified liquid of oleophilic starch is usually desirably as good as 1% - 5% 0.5% - 10%. When it is 0.5% or less, it is lacking in the emulsion stability at the time of pickling liquid adjustment, and if it adds mostly from 10%, pickle viscosity may rise and a problem may be produced in workability.

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EXAMPLE

[Working example] This invention is not limited by these, although the embodiment of this invention and a comparative example are raised to below and this invention is explained to it still more concretely. "%" in an example is a weight reference unless it mentions specially.

[0023]

[Work example 1] Oil in water type emulsified liquid was prepared by the following methods by presentation combination of Table 1. Gell call AH-F (all are the HONEN Corporation make) 15g was added as act body TP-2, 35 g, and pregelatinization starch as beta starch, 0.5 g of oleophilic starch (octenylsuccinate-ized starch) was added to 20 ** water one by one as an emulsifier, and it was made to often distribute. Fats-and-oils HOP100SO (palm super olein, HONEN Corporation make) 100g kept at 30 ** after that was added gradually, and it was made to stir at 5000 rpm using "T. K. gay mixer" (made by special opportunity-ized industrial incorporated company). Finally, salt and 10g of sugar were added, respectively, the whole was prepared to 500 g, and oil in water type emulsified liquid was obtained.

[0024]

[Comparative example 1] Preparation of pickling liquid was tried like the conditions of Embodiment 1, without using an emulsifier. However, an oil phase and a water layer were not able to dissociate soon after adjustment, and stable oil in water type emulsified liquid was not able to be created. Therefore, suppose that each uses oleophilic starch as an emulsifier in the following embodiments and a comparative example.

[0025]

[Comparative example 2] All the loadings of HOP100SO were transposed to water as the comparative example 2, and pickling liquid was prepared.

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[Comparative example 3] The whole quantity of gell call AH-F was transposed to water as the comparative example 3, and pickling liquid was created.

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[0028]

[Table 1]

第1

		実施例1	比較例1	比較例2	比較例3	比較例4
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乳化剤	親油性澱粉	0.5		0.5	0.5	0.5
	食塩	2.0	2.0	2.0	2.0	2.0
	砂糖	2.0	2.0	2.0	2.0	2.0
	水	65.5	66.0	85.5	72.5	85.5
官能試験結果 (-1~5)						
	ジュース性	4.5		1.8	2.2	1.7
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[0029]The oil in water type emulsified liquid and the pickling liquid 500g which were prepared by Embodiment 1 and the comparative examples 2-4, After having removed the hide, putting into the rotary tumbler (product made from the Omichi industry) with 1 kg of chicken breast cut to 50-60g and inhaling to 600mmHg, the tumbling was performed at 12 rpm and 10 ** for 1 hour. Next, after saving overnight the chicken breast which performed the tumbling in a 5 ** refrigerator, it was sprinkled on wheat flour, was heated for 5 minutes with the vegetable oil heated at 170 to 180 **, and created frying without coating. After saving these frying without coating with a -18 ** freezer overnight, it was reheated with the microwave oven and flavor test evaluation was carried out by ten persons' panelist. Organoleptics evaluation carried out seven-step evaluation (-1-5) of a juicy feeling and the flavor, and showed the average value in Table 1. As a result, pregelatinization starch and beta starch are added into pickling liquid, and it turns out that the pickling liquid made to emulsify with an oil is juicy compared with the comparative example lacking in the either.

[0030]

[Work example 2] It learned from the method of Embodiment 1 by presentation combination of Table 2, and oil in water type emulsified liquid was prepared. What used gell call W-alpha (all are the HONEN Corporation make) as the gell call W-7 and pregelatinization starch as beta starch, and uses an extra-virgin olive oil (melting point of 3 **, HONEN Corporation make) as fats and oils was used as this invention article. White pepper, glutamic-acid Na, and a polylysine system sterilization agent made the last after emulsified liquid adjustment carry out the addition dissolution with salt.

[0031]

[Work example 3] Oil in water type emulsified liquid was similarly prepared using corn oil (melting point - 10 **) instead of using an extra-virgin olive oil in Embodiment 2.

[0032]

[Work example 4] Oil in water type emulsified liquid was similarly prepared using beef tallow (melting point of 45 °C) instead of using an extra-virgin olive oil in Embodiment 2.

[0033]

[Work example 5] Oil in water type emulsified liquid was similarly prepared using casein Na instead of using oleophilic starch in Embodiment 2.

[0034]

[Work example 6] In Embodiment 1, the compounding ratio of the gel called W-alpha (pregelatinized starch) and the gel called W-7 (beta starch) was changed, and oil in water type emulsified liquid was prepared similarly.

[0035]

[Comparative example 5] All the loadings of the extra-virgin olive oil were transposed to water as a comparative example, and pickling liquid was prepared.

[0036]

[Table 2]

[illegible]

